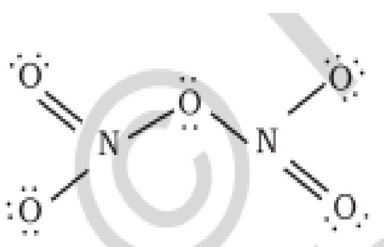
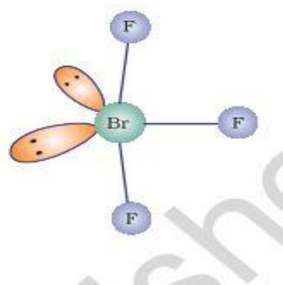
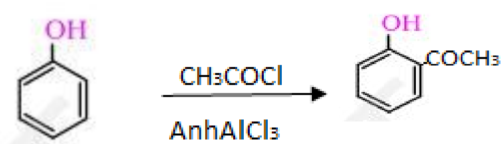
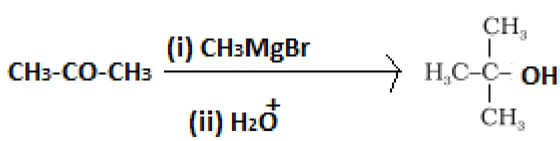
CHEMISTRY MARKING SCHEME
Guwahati -2015
SET -56/1/G

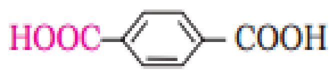
Sr. No.	Value points	Marks
1	CH_3 | $C_6H_5 - CH - Br$	1
2	Dispersed phase: Solid, Dispersion medium: Gas	½ + ½
3	**Zn : [Ar] $3d^{10}4s^2$ /** Because of Fully filled d-orbitals in ground state as well as in the oxidized state.	1
4.	2,4 – dimethylphenol	1
5.	1 F/ 1 Faraday	1
6.	Dichloridobis(ethane –1,2-diamine)cobalt (III) ion Geometrical Isomerism / cis-trans Isomerism/ optical isomerism	1+1
	OR	
6.	i) $[Ni(CO)_4]$ ii) $K_2[Fe(CN)_4]$	1+1
7.	i) $C_6H_5NH_2 < CH_3CH_2NH_2 < CH_3NHCH_3$ ii) $(CH_3)_3N < CH_3NHCH_3 < CH_3NH_2$	1+1

<table>
<tr><td>8.</td><td>$\Delta T_f = T_f^0 - T_f$
The decrease in freezing point of a solvent due to the dissolution of a non-volatile solute in it is called depression in freezing point

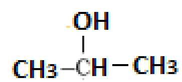
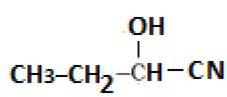
$$\Delta T_f = K_f m$$
$$\Delta T_f = K_f \times \frac{W_2 / M_2}{W_1/1000}$$
$$M_2 = \frac{K_f . w_2 \times 1000}{W_1 . \Delta T_f}$$</td><td>1

1</td></tr>
<tr><td>9.</td><td><table><tr><td>Order</td><td>Molecularity</td></tr><tr><td>Sum of powers to which the concentration terms are raised in rate law expression.</td><td>The number of reacting species in an elementary reaction.</td></tr><tr><td>May also be zero or in fraction</td><td>Cannot be zero or fraction.</td></tr></table>(or any other correct differences)</td><td>1+1</td></tr>
<tr><td>10.</td><td>
i)

ii)</td><td>1+1</td></tr>
<tr><td>11.</td><td>i) When both absorption and adsorption take place together, the phenomenon is referred to as Sorption.
ii)The colloidal dispersion/solution in which the dispersed phase has got an affinity for the dispersion medium / solvent loving.
iii)Colloids in which small sized dispersed phase particles aggregate to form particles of sizes within the colloidal range (micelles) at a definite concentration of the solution(above CMC)/substance which act as strong electrolyte at low concentrations but act as colloids at higher concentration due to micelle formation.</td><td>1+1+1</td></tr>
</table>

12.	a)Impure Zr reacts with I_2 to form volatile ZrI_4 which when heated at higher temperature decomposes to give pure Zr. b)CO acts as a reducing agent . c) It is a mixture of Cu_2S and FeS.	1+1+1
13.	i) Due to intermolecular H-bonding in ammonia . ii) Bond dissociation enthalpy of H—Te bond is lesser than that of H—S bond. iii)$Cl_2 + H_2O \longrightarrow HOCl + HCl$ or Due to the formation of Hydrochloric acid and Hypochlorus acid.	1+1+1
14.	(a) (i) sp^3d^2, Octahedral (ii) sp^3, Tetrahedral (b) CO, because of synergic or back bonding.	½ + ½ ½ + ½ ½ , ½
15.	(i) $CH_3-CH_2-CH_2OH$ (ii) $CH_3-CH_2-CH(OH)-CH_3$ (iii) 	1+1+1
16.	(i) (ii)  $CH_3-CH_2-Cl + CH_3ONa \Rightarrow CH_3-CH_2-O-CH_3$ (iii)  (Or any other correct method.)	1+1+1

17.	(i) Aniline being a base reacts with $AlCl_3$(Lewis Acid) to form a salt. (ii) —CH_3 group shows +I – effect(electron releasing group) whereas –NO_2group shows –I- effect(electron withdrawing group) (iii)To reduce activating effect of –NH_2.	1+1+1
18.	(i) Styrene, C_6H_5–CH=CH_2 (ii) Adipic Acid HOOC–CH_2–CH_2–CH_2–CH_2–COOH Hexamethylenediamine H_2N–$(CH_2)_6$–NH_2 (iii) Ethylene glycol HO-CH_2-CH_2-OH  Terephthalic acid (note: half mark for name/s and half mark for structure/s) **OR**	1/2 + 1/2 ½ + ½ ½ + ½
18.	1. Linear polymers – Monomeric units join to form long polymeric chains. 2. Branched chain polymers - Monomeric units join not only to form long polymeric chains but also branches. 3. Three dimensional network polymers or cross-linked polymers- Monomeric units join to form long polymeric chains and cross links.	½ + ½ ½ + ½ ½ + ½
19.	(i) $HOH_2C\text{-}(CHOH)_4\text{-}\underset{\displaystyle H}{\overset{\displaystyle CN}{\overset{\vert}{\underset{\vert}{C}}}}\text{-}OH$ (ii) Intermolecular H-Bonding. (iii) Pernicious Anaemia.	1+1+1
20.	$\frac{p_1^0 - p_1}{p_1^0} = \frac{w_2 \times M_1}{M_2 \times w_1}$ $\frac{17.5 - P_1}{17.5} = \frac{15/180}{\frac{15}{180} + \frac{150}{18}}$ $= \frac{15}{1515}$ $= 0.01$ $17.5 - P_1 = 0.01 \times 17.5$ $17.5 - 0.175 = P_1$ $P_1 = 17.325$ mmHg	1 1 1

21	(i) Crystalline solids – They have definite and regular geometry which extends throughout the crystal .i.e , they have long range order . (ii) Frenkel defect – caused by the dislocation of cation in the crystal lattice. (iii) n – type semiconductor – These are obtained due to metal –excess defect or by adding trace amounts of group 15 elements (P , As) to extremely pure silicon or germanium by doping .	1+1+1
22.	$k = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$ $k = \frac{2.303}{10min} \log \frac{100}{75}$ $k = \frac{2.303 \times 0.125}{10min}$ $k = 0.02879\ min^{-1}$ $t_{1/2} = \frac{0.693}{k} = \frac{0.693}{0.02879\ min^{-1}}$ $t_{1/2} = 24.07min$	½ ½ 1 1
23.	(i) Concern for students health, Application of knowledge of chemistry to daily life, empathy , caring or any other (ii)Through posters, nukkad natak in community, social media, play in assembly or any other (iii)Tranquilizers are drugs used for treatment of stress or mild and severe mental disorders. Eg: equanil (or any other suitable example) (iv) Aspartame is unstable at cooking temperature.	½, ½ 1 ½ , ½ 1
24	(i) +3 oxidation state of Eu is more stable. (ii) Due to d-d transition / unpaired electrons in d orbitals. (iii) Due to completely filled d-orbitals which leads to weak metallic bond. (b) (i) $2KMnO_4 \xrightarrow{\Delta} K_2MnO_4 + O_2 + MnO_2$ (ii) $Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+} \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$ OR	1 1 1 1 1
24	(a) (i)because small size atoms like B, C , H,N occupy interstitial sites in the lattice of transition elements. (ii) Because Cr^{3+} has the stable t_{2g}^3 configuration whereas Mn^{2+} has stable $3d^5$ configuration(half filled). (iii) Due to involvement of d-electrons in metallic bonding.	1 1 1

	(b) Misch metal is an alloy which consist of a lanthanoid metal(95%) and iron (5%) and traces of S,C,Ca and Al. USE- It is used in Mg-based alloy to produce bullets, shell and lighter – flint.	1 1
25.	(a) A- CH_3COCl B- CH_3CHO C-  D- CH_3CH_2OH b) i)On heating with NaOH/ I_2 , $CH_3COCH_2CH_3$ gives yellow ppt of CHI_3 whereas $CH_3CH_2CH_2CHO$ does not. ii)On adding $NaHCO_3$ solution , ethanoic acid gives brisk effervescence whereas ethanal does not. (Or any other distinguishing test) c) $CH_3COCH_2CH(Cl)CH_3$	½ x 4=2 1 1 1
	OR	
25.	(a) (i) CH_3-CH_2-CH_3 (ii) CH_3-CH_2-CH=N-OH (iii)  (b) HCHO › CH_3CHO › CH_3COCH_3 (c) On heating with NaOH/ I_2 , $C_6H_5COCH_3$gives yellow ppt of CHI_3 whereas C_6H_5CHO does not. (or any other distinguishing test)	1 1 1 1 1

26.	E_{Cell} =(E^Oc-$E^O{}_A$) – 0.059/2 V log [Mg^{2+}] /[Ag^+]^2 = [.80-(-2.37)]-0.059/2 V log [10^{-2}/(10^{-4})^2] = 3.17-0.0295 V X log 10^6 = 3.17-0.0295 V X 6 = 3.17-0.1770 = 2.9930 V ΔG = -nFE_{Cell} = -2 X 96500 $Cmol^{-1}$ X 2.9930 V = -577649 $Jmol^{-1}$ = -577.649 $kJmol^{-1}$	1 1 1 ½ ½ 1
	OR	
26.	Λ_m=(k/M) x 1000 Scm^2mol^{-1} = (4.95 x 10^{-5}/0.001) x 1000 Scm^2mol^{-1} = 49.5 Scm^2mol^{-1}	 ½ 1

	$\alpha = \Lambda_M / \Lambda^0_M$ $\Lambda^0_M = \lambda^0_{CH3COO-} + \lambda^0_{H+}$ $= (40.9+349.6)\ Scm^2mol^{-1}$ $= 390.5 Scm^2mol^{-1}$ $\alpha = 49.5/390.5$ $= 0.127$ or 12.7% b)Which converts energy of combustion of fuels directly into electrical energy. Advantages: high efficiency,pollution free	½ 1 1 1